II. "Chemical Examination of the Fluid from the Peritoneal Cavity of the Nematode Entozoa." By Dr. W. Marcet, F.R.S. Received January 24, 1865.

Some time ago Dr. Cobbold sent me a quantity of fluid which he had extracted from about seventy perfectly fresh specimens of the *Ascaris megalocephala* of the horse, and he requested me to make an analysis of it. I most willingly availed myself of this unusual opportunity of ascertaining the composition of this fluid, the sample procured by Dr. Cobbold being fortunately large enough for the purpose.

The analysis of this fluid is interesting as showing that its composition is similar to that of juice of flesh in the higher animals, and consequently that the process of assimilation occurs in these worms much in the same way as in those animals where the organs of digestion and circulation are perfectly developed. It also shows that a fluid similar to that existing in muscular tissue is apparently elaborated by the intestines of the *Ascarides*, while in the higher animals this fluid is formed from the blood.

The fluid was turbid, of a pale yellow colour, and emitted an offensive odour, although not of decomposition.

Microscopical Examination.

Principally fine granular matter; a few elongated bodies, some convoluted, as if consisting of this granular matter cast by passage through a membranous tube. Some, but very few, spiral vegetable fibres and scales.

Chemical Examination.

Specific gravity 1·029, reaction slightly acid. 5 cubic centimetres were evaporated to dryness, which yielded, in 1000 parts,

Solid residue	82·7
Water	917·3
	1000·0

The fluid, when nearly boiling, coagulated into a solid mass, it therefore contained a large quantity of albumen.

With the object of separating the colloid from the crystalloid constituents, I measured off 10 cub. centims. of the liquid and dialyzed it for twenty-four hours in a 6-inch dialyzer. By this operation the fluid lost its acid reaction, becoming neutral; it has also parted with its smell.

The Colloid Fluid.—The solution remaining on the dialyzer consisted principally of albumen; it was evaporated to dryness, and the weight of the residue determined; this amounted to 0·532 grm., being 53 per 1000 of the fluid analyzed. The total solid constituents of the fluid being 82·7 per 1000, it will be seen at once that about $\frac{2}{3}$rds of the total residue consisted of colloid substances, and $\frac{1}{3}$rd of crystalloid. These numbers should be accepted as approximate results, there being no substance possessed of

absolutely colloid or crystalloid properties, and a small proportion of colloid having probably found its way through the membrane.

The dry colloid residue was incinerated, and found to contain 1·9 per cent. of ashes, which is so small a proportion as to show that very nearly the whole of the inorganic constituents of the fluid had passed through the membrane of the dialyzer.

The Crystalloid Fluid.—This consisted of the solution in distilled water of those constituents of the ascaris-fluid which had found their way through the diaphragm of the dialyzer. It contained no albumen but some organic matters, and very nearly the whole of the inorganic salts of the original fluid. Evaporated nearly to dryness, a mass of crystals appeared after a lapse of time in the thick residue. A part of the residue being ignited left a large proportion of ash, which was found to consist nearly entirely of phosphoric acid and potash. The aqueous solution of the ash reacted strongly alkaline, and emitted no carbonic acid when tested with a mineral acid, showing that there existed more phosphoric acid than was necessary to combine with the whole of the bases present. The absence of sulphates, of more than traces of chlorides, and of lime was very remarkable; there might have been some soda present, but potash greatly predominated. There is no record in my note-book as to the presence or absence of magnesia.

I now submitted to examination a solution in distilled water of the crystalloid residue. It reacted acid; the addition of a solution of nitrate of silver gave an abundant white precipitate with a slight yellow tinge, the fluid being acid before and after precipitation. There was therefore but a small proportion of common tribasic phosphate of potash present, and there appeared to be a much larger proportion of the bibasic phosphate; the former giving a yellow, and the latter a white precipitate with nitrate of silver.

I finally determined the fatty matters present in a given weight of the original fluid, and found that 1000 parts of the ascaris-fluid contained 5·1 parts of fat.

Conclusions.

We may conclude from this inquiry that nutrition in the nematode worms can be carried on by means of a fluid containing few other substances besides albumen and phosphate of potash. If we now consider that the principal constituent of juice of flesh is phosphate of potash, both tribasic and bibasic, that the ascaris- and flesh-fluid are both acid, that in both fluids there is a very small quantity of chlorides with but very little or no soda and little or no lime, we shall be able to draw a very interesting parallel between the assimilation in the highest and lowest animals.